Summary Report

Four-Week Test of Pump Station S-332D

August 30, 1999 to September 27, 1999

South Florida Water Management District

August 2000

Submitted to:

Florida Department of Environmental Protection

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INTRODUCTION

S-332D is a pump station located near the junction of the L-31N and L-31W canals (see **Figure 1**), west of Homestead, Florida. It is rated for 568 cfs, 500 cfs diesel and 68 cfs electric. It was constructed by the U.S. Army Corps of Engineers and conveyed to the South Florida Water Management District in December 1997. Its purpose was to increase flows from the L-31N canal toward Taylor Slough and Florida Bay, and to maintain flood protection for the C-111 Basin. Its implementation was planned as part of the Experimental Program of Water Deliveries to Everglades National Park, Test Iteration 7, Phase II. Under this phase of the Experimental Program, use of S-332D was intended to promote overland flow of water into Taylor Slough by raising canal stages in the L-31W canal, allowing overbank flow to mimic more natural sheetflow into Everglades National Park. The South Florida Water Management District (SFWMD) applied for a general permit with the Florida Department of Environmental Protection. However, issues raised by interested parties during the permit process caused the application to remain incomplete through several extensions.

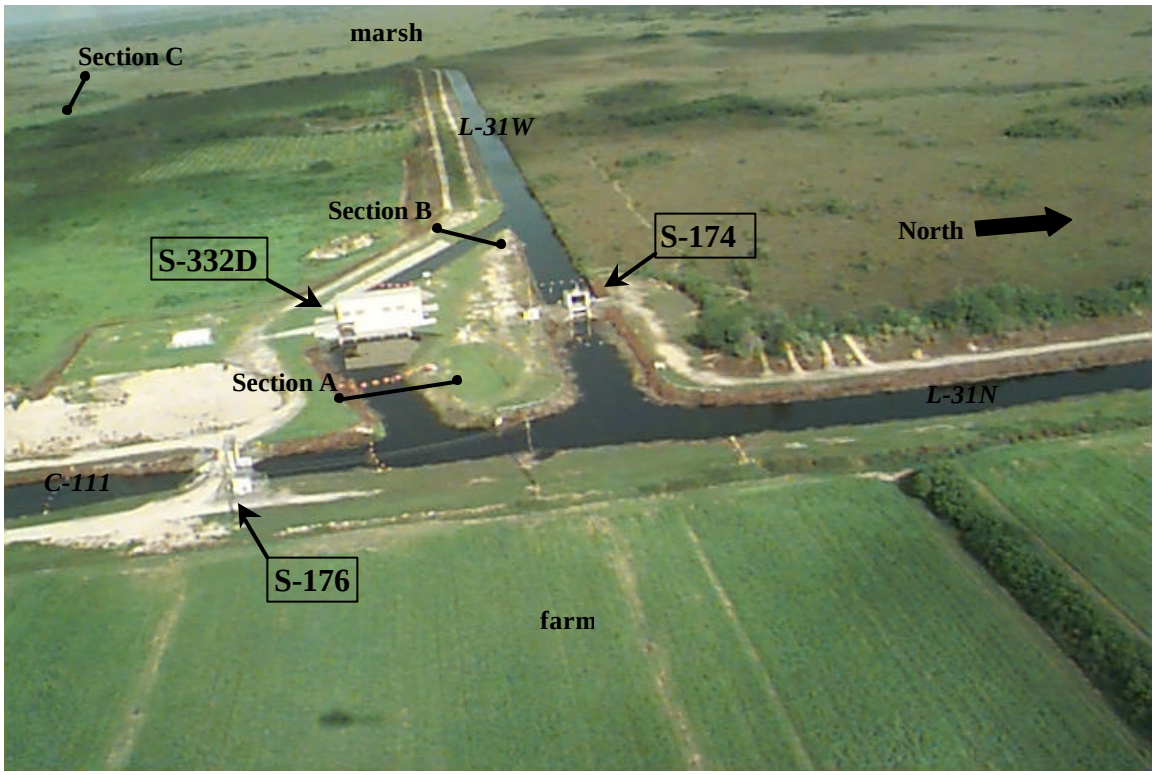

Figure 1. Aerial view of S-332D and nearby features

In light of the difficulties to permanently implement the operation of S-332D, SFWMD proposed a short-term, focused field experimentation that could begin to address the issues raised in the permit process. The operational objectives of the test were to raise water levels in the L-31W

canal to meet or exceed a rainfall-driven target, and to allow canal water to overflow into the Taylor Slough marsh.

Intensive monitoring of hydrologic and water quality parameters was conducted. With the data, a preliminary assessment of this operation is presented in this report. Operational experience was gained on the flexibility and limitations of the use of S-332D. The information obtained from the pump test is a first step in the development of more comprehensive testing of S-332D and wider-scale monitoring of its effects, with the eventual goal of implementing its operation as part of the C-111 and Modified Water Deliveries projects.

ANTECEDENT CONDITIONS

Hurricane Dennis skirted the coast of South Florida between August 26-28, immediately prior to the start of the pump test. Canals were lowered in anticipation of heavy rain, which didn't materialize. Had this category 2 storm made landfall in South Florida, the damage could have been extensive. Dennis dropped 19 inches of rain in North Carolina and caused $157 million in damages.

The antecedent rainfall conditions were at the high end of the normal range. The rainfall for Miami-Dade for the month of June was 141% of normal. July was 83% of normal and August was 128% of normal. The rainfall for the wet season up to the beginning of the pump test totaled 26.94 inches, or 120% of the 30-year mean.

Figure 2 shows the location of canals L-31N, L-31W, and C-111. The canal water levels prior to the pump test were within the operating ranges specified under Test 7 Phase 1. The water level upstream of S-176 was 4.8 ft. The operational range for the L-31N canal upstream of S-176 is 4.75 ft to 5.0 ft. The water level upstream of S-177 was 3.7 ft. The operational range for the C-111 canal upstream of S-177 is 3.6 ft to 4.2 ft. Finally, the water level upstream of S-175 was 4.6 ft, which is below the maximum of 4.7 ft for the rainfall-driven target in the L-31W canal.

The groundwater gradient, indicating the direction of groundwater flow in the area, presented a typical west-to-southeast slope. Three transects were used to assess the antecedent conditions of groundwater gradients in the area. **Figure 2** shows the location of the transects and the water levels along those transects prior to the pump test. For simplicity in describing the conditions prior to the pump test, the water level was computed as the average of the 24 hours preceding the pump test, rounded off to the nearest 1/10 of a foot. Water levels in three locations were considered for the area south of S-331: G-3437, L-31N between S-331 and L31NT, and Humble with values of 6.1, 5.0, and 4.8 ft, respectively. The slope along this transect indicates a groundwater gradient from Rocky Glades to the L-31N canal, and from the L-31N canal to the C-111 basin. Three gages were considered for the area north of S-176: Rutzke, S-176 HW, and G-789 with values of 5.5, 4.8, and 4.0 ft, respectively. This transect indicates a groundwater gradient from Rocky Glades to the L-31N canal, and from the L-31N canal to the C-111 basin. The C-113 canal may also influence gage G-789, causing a more southerly gradient near the gage. Finally, water levels at seven locations were considered in the Frog Pond vicinity: NTS1,

L-31W between S-174 and S-175, FROGP1, FROGP, FROGP2, C-111 between S-176 and S-177, and Robblee with values of 5.3, 4.6, 4.7, 4.2, 3.8, 3.7, and 3.6 ft, respectively. The antecedent conditions near the Frog Pond, as indicated by these water levels, showed a groundwater gradient from the Taylor Slough marsh to the L-31W canal, from the Frog Pond to the L-31W canal, from the Frog Pond to the C-111 canal, and from the C-111 canal to the C-111 basin.

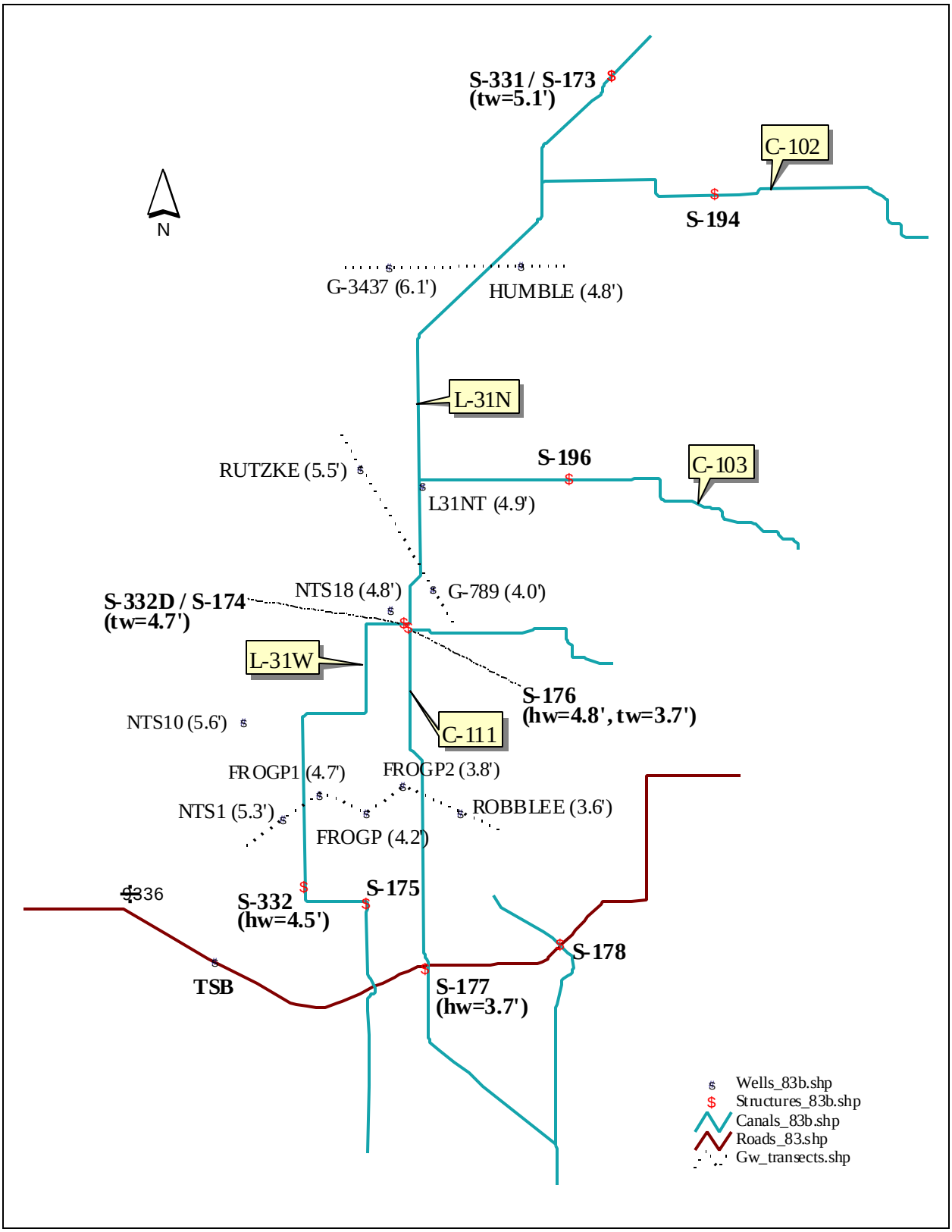

Figure 2. Location of Water Level Monitoring Sites and Approximate Water Level Immediately Prior to Pump Test. (gw=groundwater, hw=headwater, tw=tailwater)